3855 North Ocoee Street, Suite 200, Cleveland, TN 37312
(423) 336-4600 FAX: (423) 336-4166

May 26, 2010

Ms. Beth Walden
Remedial Project Manager
United States Environmental Protection Agency
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-8960

Re: Response to EPA Comments on *Vegetation Sampling Work Plan, Operable Unit 2, McIntosh, Alabama* dated April 21, 2010
Olin Chemicals/McIntosh Plant Site, Operable Unit 2
McIntosh, Alabama

Dear Ms. Walden:

Olin received EPA's comments on the *Vegetation Sampling Work Plan, Operable Unit 2, McIntosh, Alabama* (work plan) (dated April 21, 2010) on April 27, 2010. A conference call to discuss the comments was held on May 14, 2010 and included EPA, Olin, and MACTEC representatives. The enclosed responses to the comments reflect the conference call discussion. EPA's comments are presented in normal text and Olin's responses are presented in italics. The response to comments are submitted as an addendum to the work plan so that resubmittal of the work plan is not necessary.

Please let me know if you have any questions. I can be reached at (423) 336-4388 or via e-mail (kdroberts@olin.com).

Sincerely,

OLIN CORPORATION

Keith D Roberts

Keith D. Roberts
Director, Environmental Remediation

cc: S.B. Favors – ADEM
A.B. Carringer – Olin
T. B. Odom – Olin
C.E. Draper - MACTEC

May 26, 2010

RESPONSE TO EPA COMMENTS ON THE VEGETATION SAMPLING WORK PLAN OPERABLE UNIT 2, McINTOSH, ALABAMA

General Comments

1. Mercury in vegetation should be analyzed by Method E245.6, because it has a sample digestion procedure that is better suited to complex sample matrices found in tissues. It is a newer method that in EPA's experience gives lower detection limits and more reliable results than Method 7471. Method E245.6 gives accurate results that are better suited to predicting plant uptake of mercury. With Method E245.6 the plot of mercury concentration in plants to mercury concentration in soil will be less scattered, achieving a more accurate estimate of bioaccumulation. Methyl mercury in vegetation should be analyzed by Method E1631, which is a similar method. In order to achieve the best estimate of bioaccumulation in plants, EPA also recommends that the Method E245.5 should be used for analyzing mercury in soils/sediments co-located with the plant samples (same method but for soils/sediments).

   Response: Methods E245.6 and E1631 will be performed for vegetative sample analysis. Similar reporting limits are achievable for both Method E245.6 and 7471 according to the analytical laboratory and EPA-approved quality assurance project plan (QAPP) for OU-2, but Methods 245.6 and E1631 provide for a more aggressive extraction of tissue. Method 7471A will be performed for the soil and sediment samples based on EPA's May 19, 2010 e-mail to Olin.

2. The work plan should discuss the anticipated concentrations of chemicals of concern (COCs) in the soils in the areas where the samples are to be collected. The gradient of contamination should be taken into account in the sample design. The sample design should aim to collect a vegetation sample from the most contaminated location in the terrestrial habitat. Other samples should aim for moderately contaminated locations. Because we have three contaminants, the sampling design might have to get creative to capture maxima of each. The reason for attempting to sample the maximum concentrations in soils is because sampling over the widest range of concentrations improves the estimate of the bioaccumulation factor, derived from a plot of plant tissue concentrations versus soil concentrations. The confidence interval around the slope of a bioaccumulation line drawn on such a plot can be narrowed (more precise estimate), for a given number of samples, by sampling over the widest gradient of concentrations possible.

   Response: Vegetation sampling locations and analyses were selected based on known historical distributions of COCs in floodplain soils. Each vegetation sample will be analyzed for mercury and methylmercury because mercury and methylmercury are the main COCs at OU-2. The sampling locations are spaced around the Basin to capture the expected range of mercury and methylmercury concentrations. Hexachlorobenzene (HCB) has been predominately detected in the southern portion of OU-2 based on both historical and current distribution patterns. Vegetation samples located in the eastern and southern portion of the OU-2 are accordingly proposed for HCB analysis, with an additional vegetation sample for HCB analysis in the northeastern portion of OU-2 (Figure 3-1 of the work plan). Higher concentrations of the 2,4'- and 4,4'-isomers of DDT, DDE, and DDD (collectively DDTR) were historically found in the northern portion of OU-2, and terrestrial vegetation samples for DDTR analysis are focused in this area. EPA expressed concern over potential impacts from Ciba's discharge ditch, and samples for DDTR analysis were added on the eastern side of the Basin. Aquatic vegetation samples for DDTR analysis were also proposed in the southern portion of the Basin.

   The locations of the proposed terrestrial and aquatic vegetation samples were placed to account for expected distributions of COCs and potential range in concentrations of the various COCs

based on historical and current data. Tables 1 and 2 list the concentrations of COCs in sediment and floodplain soils in the southern, central, and northern portions of OU-2. Figure 1 shows the division of the southern, central, and northern portion of OU-2. This table was prepared based on EPA's recommendation made during the May 14, 2010 conference call. EPA's request has been met in the existing sampling design provided in the work plan.

3. Discuss the types of vegetation that will be sampled. Samples should be taken from low-growing vegetation only a couple feet off the ground. Perennial plant leaves and annuals with high leaf surface area should be targeted. Plants with rough or textured leaves are preferred. Spanish moss can be used. Include the SOP.

   Response: Sampling locations will be selected that provide a consistent mixture of representative vegetation at each location, as stated in the work plan. Herbaceous or small shrubs (leaves only) will be targeted for sampling. Vegetation present at the time of sampling will be dependent on the amount of time the area has not been inundated and the season the samples are collected. Actual targeted species cannot be determined until sampling commences. Field personnel will identify and record in the field logbook the species collected at each sampling location. The field crew will attempt to target similar species assemblages at each location; however, this may not be possible at each location, and opportunistic sampling may occur. Vegetative sampling SOPs were requested from EPA; the information forwarded by EPA was for data quality objective development for vegetative sampling, not SOPs. The sampling procedures, as specified in the work plan, were developed based on the experience of experts in tissue sampling and site knowledge. No additional SOPs are available. Standard operating procedures for the chemical analyses and preparation are discussed in the EPA approved QAPP.

4. The DDT-R, mercury, and hexachlorobenzene should be measured in plant tissue from all stations. DDT-R has been detected at relatively high levels in the northwestern portion of the basin. EPA is not ready to assume DDT-R is only found in the northern part of the site.

   Response: The sampling locations and analyses, as described in the response to Comment 2, were designed to represent tissue and soil north, east and south of the Basin/Round Pond. The Bluff, located west of the Basin and Round Pond, is not appropriate for tissue and floodplain soil sampling. Each vegetative tissue sample will be analyzed for mercury and methylmercury. Fewer HCB sample locations/analysis were proposed north of the Basin, because it was not detected there historically. HCB analysis has been proposed for locations on the northeastern, eastern, and southern sides of the Basin. Figure 3-1 shows that vegetation analyses for DDTR are located throughout OU-2 in the north, east, and south. Additional sampling is not recommended nor necessary to provide a representative range of results for DDTR and HCB.

5. All 2,4'- and 4,4'- congeners of DDD, DDE, and DDT should be measured. The database should report the individual congeners as well as the sum of the six congeners.

   Response: Vegetation and sediment samples will be analyzed for DDTR, which is the 2,4'- and 4,4'- congeners of DDD, DDE, and DDT. The typographical error in the work plan (2,2'- and 2,4'- DDT, DDE, and DDD) is corrected herein so that the congeners are listed as 2,4'- and 4,4'-DDT, DDE, and DDD. The database will report individual and sums of the congeners, consistent with previous database submittals, where individual congener data were available..

RESPONSE TO EPA COMMENTS ON THE VEGETATION SAMPLING WORK PLAN OPERABLE UNIT 2, McINTOSH, ALABAMA

6. Soil samples should be dry sieved to 2-mm to remove gravel and woody debris. This practice will reduce variability. Dry sieving means not adding any water. Materials are pressed through the sieve with a gloved hand.

   Response: Soil samples in the floodplain will be hydric and may be saturated at the time of sample collection. Olin/MACTEC will make reasonable efforts to sieve the sample as part of field sample preparation. Greg McDermott of Neptune will be present during the sampling and aid in determining the practically of dry sieving. The sample will be handled with decontaminated equipment only. Direct handling with a gloved hand is not recommended.

7. Vegetation samples should be frozen to a deep freeze (10°C) and preferably shipped on dry ice.

   Response: Battelle Marine Sciences Laboratory in Sequim, Washington (Battelle) recommends that vegetative tissue samples not be frozen because of the damage caused to the tissue when the sample is thawed for processing. Battelle recommends shipping the vegetative samples on wet ice. Battelle will process the samples upon receipt and then freeze sample aliquots for analysis.

8. Include total organic carbon and grain size on soil/sediment samples.

   Response: The soil/sediment samples will be analyzed for total organic carbon. Several sample aliquots will be combined to produce a sufficient sample size of 32 ounces for grain size analysis to represent the southern, central, and northern portions of the Basin and floodplain area.

9. Discuss the level of quality review that data will receive, such as how data quality flags will be assigned.

   Response: Data quality evaluation for data collected at OU-2, including assignment of data validation qualifierswill be performed in accordance with Section 4.0 of the project QAPP.

10. Include in the revised work plan the standard operating procedures for vegetation sampling and for sample preparation prior to sample digestion. Proper sample preparation is critical to obtaining reliable results.

    Response: Vegetative sampling SOPs were requested from EPA; the information forwarded by EPA was for data quality objective development for vegetative sampling, not SOPs. The sampling procedures, as specified in the work plan, are the site-specific SOPs for OU-2 and were developed based on the experience of experts in tissue sampling, site knowledge, and other information supplied by EPA. No additional SOPs are available. Standard operating procedures for the chemical analyses and preparation are discussed in the EPA approved QAPP.

11. Please include the name of the laboratory where the samples will be sent.

    Response: Tissue analyses for mercury, HCB, and DDTR will be sent to Pace Laboratories in Green Bay, Wisconsin. Soil/sediment analyses for mercury, HCB and DDTR will be sent to Accutest Laboratories in Dayton, New Jersey. Soil/sediment and tissue analyses for methylmercury will be sent to Battelle, Sequim, WA.

Table 1
Mercury, HCB, and DDTR Concentration Averages and Ranges in Surficial Sediment
OU-2 McIntosh

Location in Basin and Round Pond (See Fig. 1)	Mercury Concentration Average (Range) mg/kg				HCB Concentration Average (Range) mg/kg				DDTR Concentration Average (Range) mg/kg			
	Historical (1991, 1992, and 1994)		Current[a] (2009)		Historical (1991, 1992, and 1994)		Current (2009)		Historical (1991 (DDTr) & 1994 (DDTR))		Current (2009 (DDTR))	
North	21.7	(<0.19 - 290)	24.3[b]	(14.1 - 35.7[b])	0.48	(<0.5 - 1.8)	0.03	(0.02 - 0.03)	55.7	(1.03 - 177)	0.14	(0.06 - 0.22)
Central	45.9	(0.34 J - 246)	37.0	(7.1 - 116)	1.12	(<0.023 - 20)	2.49	(0.63 - 5.97)	7.91	(0.272 - 45.1)	0.72	(0.31 - 1.14)
South	30.0	(0.074 - 128)	13.8	(2.01 - 20.9)	22.9	(0.074 - 265)	6.18	(3.45 - 8.9)	2.94	(0.304 - 6.9)	2.68	(2.68 - 2.68)

Notes:

Prepared/Date: KPW 05/26/2010
Checked/Date: AWM 05/26/2010

Non-detects were treated as one-half the reporting limit in calculating an average concentration.

a - Sample results for each 2009 sample location represent composite results either by sample composite in the field or mathmatical averaging of discrete sampled collected within the same location.

b - Locations 502-NE, -NW, -SE, -SW, and -CTR were considered an isolated area of higher mercury concentration (average 83.1 mg/kg) and not representative of the northern portion of the Basin. They were excluded from the range and average.

< - Constituent not detected above the given reporting limit

HCB - hexachlorobenzene

DDTR - 2,4' and 4,4' isomers of DDD, DDE, and DDT

DDTr - 4,4' isomer of DDD, DDE and DDT

DDD-dichlorodiphenyldichloroethane

DDE - dichlorodiphenyldichloroethylene

DDT - dichlorodiphenyltrichloroethane

J - estimated based on QC data

mg/kg - milligram per kilogram

Table 2
Historical Mercury, HCB, and DDTR Concentration Averages and Ranges in Floodplain Soil
OU-2 McIntosh

Floodplain Locations (See Fig. 1)	Mercury Concentration Average (Range) mg/kg[a]		HCB Concentration Average (Range) mg/kg[a]		DDTR Concentration Average (Range) mg/kg[a]	
	1992 and 1994		1992 and 1994		1994	
North	6.61	(<0 15 UJ - 25)	0.2[b]	(0 051 - <0.5)	91.8	(41.2 - 177)
Central	7.28	(0.32 J - 20)	0.32	(0.094 - 0.67)	1 36	(0.74 - 1.90)
South	1.7	(0.16 J - 5 J)	1 55	(<0.5 - 8 2)	NS	NS

Notes:

Prepared/Date. KPW 05/24/2010
Checked/Date: AWM 05/24/2010

Non-detects were treated as one-half the reporting limit in calculating an average concentration.

[a]Historical sampling locations in floodplains may have represented sediment at the time of the historical sampling. When uncertain of classification as either sediment or soil, data results were included in both Table 1 and Table 2.

[b]The majority of HCB results were non-detect, and the reported average is likely an artifact of the detection limit rather than an actual detection.

< - Constituent not detected above the given reporting limit
HCB - hexachlorobenzene
DDTR - 2,4' and 4,4' isomers of DDD, DDE, and DDT
DDTr - 4,4' isomer of DDD, DDE and DDT
DDD-dichlorodiphenyldichloroethane
DDE - dichlorodiphenyldichloroethylene
DDT - dichlorodiphenyltrichloroethane
J or UJ - estimated based on QC data
mg/kg - milligram per kilogram

ROUND POND

North

BASIN

Central

South

INLET CHANNEL

TOMBIGBEE RIVER

Legend

North, Central, South Division Line

0 200 400 600 800 Feet

Source: USDA/FSA - Aerial Photography Field Office - 2009

Olin McIntosh OU-2

South, Central, and North Areas of OU-2

Prepared by/Date: THP - 5/26/10 Checked by: CED - 5/26/10 Project Number: 6107090035	MACTEC	Figure Number: 1

Map Document: (G:\Projects_GIS\Projects2007\olin_mcintosh\Report mxds\SAV\mxds\figure_1rev2.mxd)
5/26/2010 – 11:14:59 AM